SOME PROBLEMS OF THE AUSTRALIAN APPLE EXPORT INDUSTRY.

PRESIDENTIAL ADDRESS

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During the course of investigations into the cause and control of bitter pit and associated diseases of apples it has become apparent that a number of other problems connected with the apple export industry remain unsolved. Some are of major importance and intimately connected with its future prosperity. These may be conveniently grouped according to their relation to (a) production, (b) quality when marketed, and (c) marketing. No real distinction can, however, be maintained as all are closely interlinked and all are ultimately related to the *raison d'être* of the industry, namely profit to the growers.

It is not proposed to deal with all the problems which have come to our notice, but rather to confine the discussion to those which seem to be of greatest importance at the present moment.

The export trade has its origin in the fact that production exceeds consumption in Australia by 1,000,000 to 3,500,000 bushels per annum. Fortunately there exists in Europe and to a lesser extent in India, Java, and other Eastern countries, a market for this surplus. On the whole this export trade has been fairly profitable in the past and has, to a large extent, prevented the undue glutting of the Australian markets. The overseas markets have also prevented any marked diminution of the area under apple trees in any State, but at the same time have not justified any great increase of plantings in recent years. The industry is practically stationary as regards area, though the greater average age of the trees and improvements in cultural methods, etc., have increased yields generally. Any marked extension of the area under trees is unlikely unless the export industry can be made more profitable. If not, we must look forward to a slow expansion keeping pace with the increase of population in Australia. The problems dealt with in this paper are all related to the possibility of making apple export more profitable and of justifying a more rapid extension of the apple-growing industry.

1. The most marked feature of apple production in Australia is the variation from year to year of the size of the crop and consequently of the exportable surplus, although the bearing area has been relatively stationary for the past ten years or more. The annual production varies from 5,000,000 to 9,000,000 bushels with an Australian consumption of 4,000,000 to 5,500,000 bushels per annum. In Queensland and New South Wales the production fails to meet the consumption, the deficiency being supplied

mainly from Victoria and Tasmania. In Victoria the production may barely meet local requirements or may yield a large surplus for interstate and overseas shipment. South Australia does not figure largely in the export trade, except in occasional years. Western Australia has nearly always a surplus ranging up to about 700,000 bushels. Tasmania alone of all the States, always produces far in excess of local requirements. In total production, Tasmania is easily first, followed by Victoria, South Australia, Western Australia, New South Wales and Queensland in that order.

The seasonal variations of the crop, as well as the relation of production to consumption in the several States, leads to a movement of fruit within Australia. Queensland and New South Wales buy apples from Tasmania and Victoria. Indeed New South Wales is the most important market for Tasmanian apples.

It is a commonplace that good apples are often hard to obtain in apple-growing centres. This is true to some extent. It does not pay to export inferior fruit. Naturally such fruit is sold locally. Tasmania differs from the other States in that its own population is too small to consume any large proportion of its second quality apples, and consequently it exports a greater percentage of "plain" grade than the other States.

The Australian apple crops have always tended to be alternately heavy and light, and this has become very marked in recent years. By some chance the heavy crops in Western Australia now coincide with the light crops of Victoria and Tasmania. In consequence there was a movement of fruit from Western Australia to the eastern mainland States in 1927 and 1929; but the reverse movements in 1926 and 1928, which were years of light crops in this State, were prevented by quarantine restrictions. Owing to the absence of Codlin Moth in this State there is a total prohibition of apples from the other States, in all of which the moth is established. The growers in Western Australia have thus been fortunate in that they have had a good local market in their years of light crops, and in their years of heavy crops reduced competition from the other States in the overseas markets and a good sale in the other mainland States for the later varieties.

Considered from the point of view of Australia as a whole, the fluctuation of the crop is very unsatisfactory. It is impossible to utilise the European market to the best advantage when continuity of supplies cannot be relied upon either in quantity or quality. In years of light crops the fruit tends to be oversized and poorer in keeping quality than in years of heavy crops. Further, it would appear, judging by prices obtained on the same markets overseas, that the relative export value of the fruit as a whole from the several States is in the following descending order: Western Australian, South Australian, Victorian and Tasmanian. (While in part this may be due to the necessity of Tasmania exporting a greater percentage of fruit of lower grade than the mainland States, this is not the whole explanation, particularly as regards Victoria.) Owing to the crop fluctuations in the several States it follows that the contribution of each to a season's export is also variable and that therefore the relative value of different seasons' exports from Australia also varies. Buyers certainly distinguish between the fruits of different States, but unfortunately one who has made very satisfactory purchases of, say, Western Australian fruit one season cannot rely on getting Western Australian fruit in either the same quantity or quality

in the next. If therefore, the export surplus from each State could be stabilised within relatively small limits of variation, both quantity and quality could be depended upon and the problems of marketing would be greatly simplified. The confidence of buyers would be obtained, much of the adverse criticism which recurs so unfortunately each season would be eliminated, growers would be able to organise their work more satisfactorily, and prices would be enhanced. The first problem is therefore: Is it possible, by means available to growers, and at reasonable expense, to reduce the existing alternation of heavy and light crops? It is, of course, recognised that fluctuations will occur from local seasonal causes, but, as will be shown later, the great cause of alternate heavy and light crops is largely independent of ordinary seasonal conditions. It is probably closely related to the so-called carbohydrate-nitrogen ratio; but it is not proposed here to deal with the solution of the problem. That this alternation of crop can be influenced was strikingly shown during the past season. The variety Dunns (Dunn's Seedling) is notably given to alternate heavy and light crops. In this State heavy and light bearing trees could, until this year, be found in any of our orchards. During the past season practically all trees of this variety bore heavily, no matter whether they would have been normally heavy or light bearing. It remains to be seen whether the bearing habits of the trees have been permanently upset and whether all trees will start in alternate bearing from this year. The upsetting of the bearing evidently commenced in 1928 when the light crop trees had little or no fruit and the heavy crop trees had light crops in agreement with a general poor crop throughout the State.

2. The second problem is one of marketing. The export season is relatively short, and its success depends largely upon lack of competition from other sources and the distribution in time and quantity of the Australian fruit at the marketing ports. Under present conditions, the shipping arrangements of each State are entered into independently. As a consequence, it is not uncommon for Australian shipments not only to arrive on markets already well supplied, but to enter into competition with each other by arriving within a few hours at the same port. For instance, two large shipments arrived at Hamburg this year within one hour of each other at a time when this market was fully supplied with American apples. No further shipments being due for two weeks, one shipment had to be stored a week. Needless to say the prices received were not satisfactory. Competition between Australian apples on weak markets due to unavoidable congestion is most undesirable.

There is no doubt that there is a distinct advantage to be gained in regulating the shipments to maintain a steady supply of Australian apples to each market in quantities determined by the probabilities of demand and competiton from other sources.. Can this be done? It is obvious that marketing will be hampered by the crop fluctuations which constitute our first problem. The problem is essentially one for those controlling the export industry, though it cannot be separated from the biological problems dealt with in this paper. There would, however, appear immediate possibilities to be obtained if those responsible in the several States could arrange for unity of action in regard to the transport and distribution of consignments. If the obvious

difficulties could be overcome, not only would the industry be in a better position to secure its requirements in refrigerated shipping space, to prevent undue competition between Australian consignments, and to better utilise available markets, but it would also be in a better position to secure accurate data as to the probabilities and extent of competition. In 1929 heavy supplies of North American apples severely affected the prices of Australian fruit in the early part of the season. Much of the Australian fruit if it had been sent later would have arrived in better condition and at a time when the competition was weakening. As regard shipping, to mention only one point, boats with a reputation for carrying fruit badly would be unable to secure loadings until such time as their refrigeration equipment had been improved.

3. The third problem is an extension of the second. It concerns the period of profitable marketing. European apple requirements during the end and early part of each year are largely supplied from North America. These supplies usually come to an end in April, but may occasionally, as in 1929, extend well into May. From mid-April to mid-June the principal supplies come from Australia and to a lesser extent from New Zealand and more recently from Chili. About mid-June local supplies of soft fruits tend to reduce the demand for apples and the market for imported fruit declines. The main Australian apple season normally extends from mid-April until mid-June, but consignments arrive on the market towards the end of March and in early April and extend into July. The problem to be solved is whether the early and late shipments are justified by results. If it be impossible to market the bulk of the fruit between mid-April and mid-June, should the season be extended by early shipments of more or less immature fruit or by later shipments of mature fruit. The tendency in Australia is to send fruit as early as possible, shipments usually commencing about the middle of February. To some extent this is done with the hope of meeting a strong market, but apparently the principal factor is the desire of growers and agents to commence the season early to avoid congestion of work later, irrespective of the effect on the quality of the fruit, provided it has reached export size. Such fruit, certainly in the case of the standard export varieties, is always more or less immature and invites and receives very unfavourable comments in Europe, though in years when American competition is light, it may obtain profitable prices. When competition is keen, as in 1927 and 1929, much of the fruit in the earlier shipments sells in Europe at 6s. to 10s. per bushel case. As shipping and marketing charges amount to from 5s. to 6s. per case, it will be realised that to pay for growing, picking, packing the case and delivery to wharf and to return a profit to the grower, not less than 10s. to 12s. per case must be obtained. When the fruit is shipped to Germany the costs are increased by 2s. 9d. per case duty and the price obtained must be correspondingly increased to be profitable. A proportion of the fruit is sold f.o.b. to brokers in Europe, particularly in Western Australia, where over 80 per cent. of the fruit was so sold in 1929. The price paid to the grower this year were, in many cases, in excess of the net prices received by the brokers who lost heavily on some shipments. Although the growers received a profitable return, it must be obvious that the brokers' losses will eventually be passed on to the industry. Further, the experience of the brokers will react unfavourably against a method of marketing the fruit which has been popular with growers owing to the elimination of risk.

In estimating the loss due to the marketing of immature fruit, due weight must be given to the effect on later sales of more mature fruit. Such fruit comes under the influence of suspicions justifiably resulting from experience gained in the earlier sales. These points must be considered when deciding whether early season shipments are justified. Of course, seasons vary, and it may be possible to ship prime fruit several weeks earlier in one season than another. It would appear that the right time to commence shipping will vary from season to season and should be determined by a study of (1) Australian crop prospects and probable maturity date, (2) American competition, and (3) the probable effects of European fruit supplies, especially cherries and strawberries. Both the opening date and length of season should be determined by the factors mentioned. The problem, therefore, resolves itself into the following. Are early shipments of immature fruit profitable to the industry? If it is impossible to confine the export to the main export season, should the season be extended earlier or later?

4. The fourth problem arises from the third. It is at present necessary to finalise arrangements in December for the commencement of shipping in February or March. At that time, neither the size or the relative earliness or lateness of the crop is known with any certainty. It may and does happen that refrigerated space is secured which later it proves impossible to fill, except with immature fruit, or indeed to utilise at all. This leads to fruit being shipped in a condition known to be immature, or to ships departing with loading space unoccupied. The former leads to complaints from European buyers and the latter to trouble and perhaps litigation with the shipping companies. In either case, the result is detrimental to the industry. To illustrate the effects of varying seasonal maturity, local experience may be quoted. In 1928 the first large consignment of the season was despatched on the 18th February from Fremantle. The immaturity of the fruit resulted in strong complaints from Europe. Acting on this result, the first large shipments in 1929 were delayed until the first week of March, with the result that they also arrived in poor condition, because the 1929 season was at least two or three weeks later than that of 1928. The danger of commencing the export of fruit on fixed dates rather than on dates determined each season, is obvious. The problem may now be stated—C a n t h e p r o b a b l e s i z e a n d r e l a t i v e m a t u r i t y o f t h e e n s u i n g c r o p b e d e t e r m i n e d n o t l a t e r t h a n m i d - D e c e m b e r ?

The following observations may have a bearing on the solution of this problem. There appears to be a distinct relationship between the size of the crop and the relative date of maturity of the earlier export varieties. Attention has been paid to the maturity date of apples in this State, especially Cleopatras, during the past three seasons. The comparison has been based upon storage tests and for the last two years on the starch-iodine test for maturity. In 1927 the crop in Western Australia was the largest to that date (900,000 bushels). In 1928 the crop was very light (400,000 bushels), and in 1929 it exceeded that of 1927, being 1,100,000 bushels. If 1927 be regarded as a normal year for maturity, that of 1928 was approximately one week earlier and of 1929 two weeks later. As regards size of crop, the principal factor appears to be a natural alternation of seasons of heavy growth and light crops with seasons of light growth and heavy crops. This fluctuation is influenced and to some extent masked by seasonal conditions, particularly dry summers and autumns which affect growth and

thrip attacks in the blossom period which affect setting. Dry summers in years of heavy crops apparently result in a succeeding crop below normal for the light year. Thrip attacks in years of heavy crops may only act as a natural thinning, but in years of light crops may seriously affect the yield. A study of the Western Australia apple yields since 1915 shows that the regular fluctuation has been broken twice by intermediate crops. With a bearing area in the neighbourhood of 7,700 acres, the yields in bushels have been as under:—

Heavy Crops.		Medium Crops.		Light Crops.	
1917 ..	648,000	1918 ..	500,000	1916 ..	293,000
1920 ..	630,000	1922 ..	538,000	1919 ..	345,000
1923 ..	759,000			1921 ..	401,000
1925 ..	657,000			1924 ..	517,000
1927 ..	901,000			1926 ..	524,000
1929 ..	1,100,000			1928 ..	409,000

It would appear that the normal light crop since 1920 has been in the region of 450,000 to 550,000 bushels, but that the normal heavy crop has increased from 700,000-800,000 bushels to approximately 1,000,000 bushels. The increase in maximum crop is probably to be traced to the increased age of the trees, to better management, to the replacement of orchards on unsuitable sites by others on better situations, and to the elimination of unsuitable varieties. If the crop of each period of three years commencing 1916 be averaged, it will be found that there has been an increase from an average of about 500,000 bushels to 700,000 bushels for the period 1925-1927. If this average be maintained for the period 1928-1930, then the potential crop for 1930 should be in the neighbourhood of 600,000 bushels. The effects of the exceptionally dry summer of 1928-29 will probably reduce the 1930 crop in Western Australia to 450,000 to 500,000 bushels maturing probably in time for shipment on and after the first week of March. While forecasts such as these may be of value, it is probable that a study of the trees in the field during the period following the setting of the fruit would give more dependable results and would certainly prove a useful check on forecasts.

5. The fifth problem relates to maturity of and wastage in exported apples. Evidence of immaturity and wastage in our shipments overseas is, unfortunately, plentiful. In the early part of each season complaints of immaturity and of bitter pit are frequent. Later in the season, the principal complaint is of breakdown either when the fruit is unloaded or during the following two or three weeks. Maturity and wastage are closely linked and are conveniently considered together.

Immature fruits are deficient in colour, flavour, texture and in keeping quality owing to their tendency to shrivel. They are also liable to be affected with bitter pit. Over-mature fruits are deficient in flavour and texture, and are very liable to breakdown and to bruising with an attendant increased liability to fungal rots.

IMMATURITY. From brokers' reports, it would appear that the principal condition associated with immaturity is lack of colour. Few complaints are made specifically in regard to flavour, texture or tendency to shrivel. In regard to colour, it is necessary to group apples into three classes.

1. Apples sold mainly as cookers with the skins distinctly green, such as Granny Smith and French Crab. These apples when fully ripe are yellow, but the trade demands that they shall arrive in an immature condition. In consequence, no complaints are received of immaturity in these varieties. Indeed it has been pointed out, when these varieties arrived in prime yellow condition, that the trade preferred green fruit. Fortunately these varieties are not highly susceptible to bitter pit.

2. Apples predominantly yellow when mature, Cleopatra, Dunns, Five Crown, Cox's Orange Pippin, etc., are important varieties of this type. Complaints of immaturity are made when these open up with green or greenish-yellow skins. Provided these apples are kept for a time at relatively warm temperatures, and are not unreasonably immature, they will colour up in good condition. If very immature, the fruit may shrivel before colouring. Unfortunately, apples of this type are frequently very subject to bitter pit if immature when picked.

3. Apples predominantly red when mature. It is of these, and particularly of the variety Jonathan, that the most complaints of immaturity are made. No further development of the red colour occurs after apples are picked. If picked too soon, therefore, the reds are lacking and what is present may become dull instead of clear and bright. The greens will turn to yellows on exposure to warm temperatures, but this does not compensate for the demand for red colour. In a general way the lack of red is an indication of immaturity, but not absolutely so, as the amount and intensity varies with districts and seasons and to some extent with the position of the fruit on the trees. Jonathans are subject to bitter pit, but from market reports it would appear that the absence of red colour is the more important factor in regard to the prices received.

It would seem probable that of immature fruit of the types predominantly yellow, ship storage temperatures should be sufficiently high to ensure colouring. With the red varieties, no method of storage will overcome the defects due to immaturity. With the green varieties, low carrying temperatures are desirable. Fortunately these are later varieties and are unlikely to be loaded with immature Cleopatras, Cox's, etc.

BITTER PIT. Complaints of the serious occurrence of this disease are frequent in the early part of each season, particularly in Cox's, Cleopatras, Sturmer and Ribston Pippin. It has been recently demonstrated (2) that bitter pit develops in apples of susceptible varieties picked in an immature condition. Obviously the control is to delay picking the fruit, but the application of this measure brings us back to the problem of economic desirability of exporting immature fruit. Unfortunately all varieties exported early in the season are more or less susceptible to the disease, the non-susceptible varieties maturing in general relatively late. It would appear from market reports that a limited amount of bitter pit in yellow apples like Cleopatra is less detrimental to sales than a lack of red colour in Jonathan. While there is little doubt that it would be desirable to avoid complaints of both immaturity and bitter pit by not sending fruits picked in an immature or poorly coloured condition, no definite stand can be taken on an economic basis. Late March and April prices have been superior to late June and July prices about as frequently as the contrary, and have

been determined mainly by competition from American apples and European cherries, strawberries, etc. Allowances must also be made for the variation in seasons in the several states. If, as has been suggested, early crops are short crops, it cannot, however, be argued that early shipments should be made in years of light crops. The fruit of light crops tends to be oversized, very liable to bitter pit, and of poor keeping quality. This would indicate that there is then more need of confining the export to the main European season—from mid-April to mid-June—than in heavy seasons. The smaller crop would also assist this concentration of the season. The better keeping qualities of heavy crops would justify an extension of the season, but it would appear desirable to the writer that the bulk of the fruit should leave Australia during March and April, and that the extension of the season should be at the latter end.

The solution of the problem, however, must be decided on the basis of competition, transport facilities, size of the export crop, and markets available.

The argument that the extension of the season is necessary on account of the difficulty of handling the export within a limited time is one which suggests the need of better organisation on the orchards and of transport facilities.

In any case, there is room for improvement in the order in which fruit is exported. It appears clear that fruit predominantly red when mature should never be exported until properly coloured. Yellow and green varieties may be exported with less danger in an immature condition. Yellow varieties like Dunns, which are not highly pit-susceptible, may be sent in a more immature condition than Cox's or Cleopatra, which are very susceptible.

BREAKDOWN. This brown collapse of the tissues approaches bitter pit in its effect on sales in Europe. It is most marked during the two to three weeks following unloading. There are several forms of breakdown, some of which require much more investigation. From reports (1) it would appear that the form occurring in our apples is mainly of the type associated with over-maturity, due to late picking or more frequently to over-long storage, especially at temperatures not sufficiently low. Cox's and Jonathans are the varieties most affected. The complaints of pit in Tasmanian Cox's and lack of colour in Western Australian Jonathans early in the season, and of breakdown in both in later shipments, indicate that their safe picking season is short. The problem may now be stated.

As wastage is due mainly to immaturity or over-maturity of the fruit when picked, what is the safe period for marketing and in what order should the export varieties be picked so as to ensure a minimum of wastage?

6. The sixth problem has relation to storage temperatures. The main export season is confined to varieties picked in February, March and April, when the temperatures, at least during the two former months, are relatively high. Fruit in a forward condition, held at these temperatures, is liable to become over-mature for export.

Between the orchard and ship's side the bulk of fruit is handled in one or the following ways:—

1. Forwarded direct to wharf. The time between picking and loading into ships' holds is usually not less than one week, but may reach or even exceed two weeks.
2. Forwarded to cold stores at port and there held until removed to wharf.
3. Stored in cold store in the country close to the orchard and then forwarded to wharf.

Distances between the orchards and the wharf or cold stores at ports naturally vary, but it may be pointed out that in this State the rail distance is upwards of 200 miles to the usual ports of shipment, and even over 300 miles when fruit from Mt. Barker is shipped from Fremantle instead of from Albany as is usual.

The mean maximum shade temperature at Perth is 84.7° in February, 81.3° in March, and 76.3° in April. This is practically the same as at Fremantle, while Albany, the other port of shipment in this State, is somewhat lower. Temperatures of 90° F. are not uncommon, and it follows that much of the fruit is exposed to relatively high temperatures which must increase the rate of maturation and reduce its storage life. The temperature of the fruit may be 75°-80° F. at loading. Such fruit may or may not be loaded together with fruit which has been pre-cooled. Pre-cooled fruit may be placed in warm surroundings for periods up to several days according to the distance of the cool store from the wharf. The ships' holds may or may not have been cooled down before loading. It is not proposed here to discuss the defects of ship refrigeration, which have been ably dealt with by investigators of the Cambridge Low Temperature Research Station (3), but to point out some of the problems arising out of present conditions.

The need for pre-cooling has been frequently emphasised, and its compulsory adoption in connection with the Australian export trade has been advocated. There is little doubt that if fruit is picked when it has reached that stage of maturity (picking maturity) at which it will continue to ripen to fruit of prime eating quality in store, that a system is required which will eliminate as far as possible the danger of over-maturity. Such a condition involves pre-cooling and loading into cool holds, so that a satisfactory carrying temperature of about 34° can be reached with little delay. However, it must be realised not only that ideal ships' storage is not available, but that large quantities of more or less immature fruit are shipped. If such immature fruit is pre-cooled and carried at low temperatures, it would follow that not only would it arrive in immature condition, but also the susceptible varieties would be more or less affected with bitter pit. Under present conditions the early fruit is not pre-cooled and is placed into relatively warm holds. Such holds take upwards of three weeks, according to the varying factors of temperature at loading time, size of hold, etc., to reach a steady carrying temperature, which is usually in the neighbourhood of 40° F. Some of the fruit may never get as low as that temperature (3). It is more than probable that the defects of immaturity and bitter pit in our early cargoes would have been greater but for the relatively high temperatures at which the fruit was carried. It appears desirable that pre-cooling should be adopted later in the season and that the ideal carrying

temperatures should be lower for the mature fruit to prevent over-maturity breakdown. The present mean carrying temperature is probably in the neighbourhood of 45°. Better results might be obtained with mean temperatures of, say, 55° early in the season, 45° in mid-season, and 35° in the later shipments. The problem is, of course, complicated by the fact that consignments consist of mixtures of varieties maturing at different seasons.

If, as suggested, the early fruit of each season should be carried at relatively high temperatures, this would have a marked economic effect on the adoption of pre-cooling. Pre-cooling obviously should be applied to all fruit loaded in one hold or not at all, otherwise much of the expense involved will be wasted and the objective sought only partially obtained. Its adoption would involve a large expenditure in building wharfside cool stores, and the various working, depreciation, and interest charges would have to be met by the fruit stored. If a large portion, say one-third to half, of the fruit should not be pre-cooled, it is obvious that the remaining two-thirds or half must bear the entire cost, which would have to be based upon the average quantity stored. Further, unless effective use such as the storage of oranges, stone fruits, etc., could be found for these stores during the remainder of the year, the apples would have to carry a proportionately higher percentage of the overhead charges, and existing stores would receive less use. It is a question which requires study whether or not it may be more economical to extend the present system of cold storage when desirable in country stores and port stores and to dispatch the fruit to ship's side in insulated or refrigerated trucks. Such trucks could be used for other purposes than for carrying fruit. The most obvious difficulties involved in this system are those of inspection, and of delays owing to late arrivals of boats. It would probably be necessary to have insulated sheds on the wharves into which the fruit would be unloaded. There it would be inspected and, if necessary, held.

Another problem which would have to be faced in a wharfside pre-cooling store, or in an insulated store, would be that of better equipment for the more rapid handling of the fruit. The amount of manual handling at present involved at Australian ports would appear to be not only slow and expensive, but detrimental to the fruit.

The main problems dealt with may be now summarised:—

1. Is it possible to reduce the seasonal variation of apple crops?
2. Would better financial returns be obtained from unified control of the Australian export trade?
3. If it is necessary to extend the main export season, should it be by earlier or later shipments?
4. Is it possible to forecast not later than mid-December the size of the ensuing crop and its relative date of maturity?
5. What is the best period for marketing export apples so as to ensure a minimum of wastage and to avoid complaints of immaturity? In what order should the export varieties be picked?
6. What are the best temperatures for storage of export apples, both on land and in ship's stores?

It is obvious that these problems are all interlinked and that the solution of some depends upon the solution of others. It is also clear that their solution could not fail to make the export industry more profitable, probably to an extent which would justify an increase in the planted area. Any improvement in the economic condition of one of our primary industries, particularly one not dependent on local markets, would be of great value to Australia, especially at the present moment.

In conclusion, it must be emphasised that the aim of the apple export industry is, ultimately, profit to the growers. While many or all of the subsidiary problems of the industry may be individually solved, no alteration in the handling of export fruit can be justifiably adopted unless the evidence is strong that the changes will more than pay for the cost of their adoption. On the other hand, the industry is practically stationary, unfavourable comments on the quality of our exported fruit all too common, and competitors in New Zealand and Chili are already on the market. There is need for us to take steps not only to place the industry on a more progressive footing, but also to hold and develop the market which is so essential to it.

The problems herein stated indicate lines of investigation which promise to assist the industry to this desirable end.

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